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STUDY OF CUCUMBER (CUCUMISSATIVAS L.) IN GREEN SHADENET HOUSE

SUCHITA V. GUPTA¹, MR. M. B. DONGARDIVE²

1. Head, Department of Farm Structures, CAET, Dr. PDKV, Akola,,
2. M.E Student, Department of Farm Structures ,CAET, Dr. PDKV, Akola,,

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Abstract: An experiment was conducted at C.A.E.T. Dr. P.D.K.V. Akola during 2nd November 2015 to 5th January 2016 in structure of shadenet house. A ground to ground type shadenet structure 8 X 5 m available with department of farm structure. Considering the importance of vegetable crop, Cucumber crop was selected for study. The crop was manually sown on 3rd November 2015. The temperature in shadenet house recorded lower than the temperature in open field condition. The relative humidity was more in shadenet house than open field condition and light intensity was lower in shadenet house than open field condition. The insect attack was observed in the month of December which was controlled by spraying insecticides. The biometric characteristics such as height of plant, number of leaves and branches were recorded in shadenet house. It has been observed that the micro climatic condition in the shadenet house was favorable for crop "cucumber".

Keywords: Cucumber (*Cucumis sativus* L.), Shade net, Shading per cent, Biometric characteristics



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Corresponding Author: MS. SUCHITA V. GUPTA

Co Author: MR. M. B. DONGARDIVE

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INTRODUCTION

Indian economy is based on agriculture. The maximum agriculture in India is rainfed and hence, the annual rainfall affects the economy of that year in India. As there is no control of farmers on the climate, farmers are facing the adverse situations during cropping period and to overcome this problem, greenhouse technology is the best solution for increasing productivity. In this research paper a study on cucumber crop is shown.

The cucumber belongs to the Cucurbitaceae (gourd family). The cucumber has genus *Cucumis* of which there are 20 to 25 species found mostly in Asia and Africa. Only two *Cucumis sativus* (cucumber) and *Cucumis melo* (melon, muskmelon and persian melon) are of commercial importance in North America. Cucumbers are very sensitive to cold temperatures and may be killed at 1°C. It has a minimum germination temperature of 16°C, an optimum germination range of 16°C to 35°C, with an optimum germination temperature of 35°C, and a maximum germination temperature of 40°C. Cucumber (*Cucumis sativus* L.) is an important and commercially popular cucurbitaceous vegetable crop which holds a very coveted position in the vegetable market. The climate of Vidarbha region of Maharashtra state is hot and dry. Specially during summer the temperature reaches to 47-48°C at relative humidity 10% to 20% under such a condition to maintain micro climate in polyhouse is a major problem. Also in commercial horticulture under polyhouse condition the microclimate factor influences the growth and development of the crop. To overcome such a problems, shadenet is advantageous than the polyhouse. The cost of construction of shadenet is less than that of polyhouse.

Objectives:

1. To study the effect of temperature, relative humidity, light intensity inside the Shadenet house.
2. To study biometric characteristics and yield inside the Shadenet house.

MATERIALS AND METHODS:

Treatments and experimental details:

In this experiment Study of environmental parameters such as temperature, relative humidity, light intensity and biometrics characteristic of vegetable "cucumber" inside green shade net house are given illustrate. The frame structure was covered with 50 per cent shade net. In addition to this the frame was covered with polyethylene sheet upto height of 1 m from ground level. This modification was made to enhance formation of CO₂ blanket at a height of 1 m. The U.V. film with 200 micron gauge was used in shadenet. The variety of cucumber HYBRID F1 GYPSY were selected for cultivation under shadenet house and in control treatment. A ground to ground type shadenet of size 8 m X 5m and modified quonset type shade net house frame

structures of size 8 m x 5 m are available with Department of Farm Structure, Dr.P.D.K.V.Akola.The soil bed was tilt manually prepared on dated 2 November 2015 inside the shadenet house.Regular irrigation, fertigation and crop protectionmeasures were adopted as per the package of cultivationpractices. The total crop period of vegetable crop in the field for 4 months from sowing.

Climatological data:

Daily inside and outside temperature ,relative humiditymeasurement at 8:00, 12:00 and 4:00 hours was carried out with the help of digital thermo hygrometer and and light intensity was measured by LUX meter at same time.

Biometric characteristics :

For recording various biometric observations sampleplants were selected from each block and tagged for theiridentification. Biometric characteristics such as plant height, number of leaves and branches were measured at regular interval. The data of biometric characteristic was collected for five representative plants. The interval of 5 days were taken the height of plant was measured with the help of scale and the number of leaves and branches was counted manually.

Support for plant:

A network of nylon respond jute and metal ropes was prepared for proper climbing & support to the plant and comfortable hanging of fruits.

Yield of fruit:

the fruit yield was measured by electronic weight balance.



Cucumber after 45 days of sowingLux meter (light intensity measuring device) and Digital hygrometer

RESULTS AND DISCUSSION:

The experimental findings obtained from the present study have been discussed in following heads:

Environmental parameter:

Temperature, relative humidity, light intensity and concentration of CO₂ are the major factors for plant growth. In the present study temperature, relative humidity, light intensity and concentration of CO₂ was recorded throughout the experiment from 2nd November 2015 to 5th February 2016.

Temperature :

The temperature plays a vital role in the vegetative growth i.e. respiration, photosynthesis, transpiration, nutrient uptake etc. The average temperature recorded inside the 50 % shadenet house at 8:00 h was 23.4^oC, at 12:00 h was 32.6^oC and at 16:00 h was 31.6^oC respectively. Also the outside average temperature recorded at 8:00 h was 26.4^oC, at 12:00 h was 38.30C and at 16:00 h was 35.9^oC.

Relative humidity :

Relative humidity plays an important role for plant growth, respiration, transpiration and water uptake by the plant during the growth. The average relative humidity recorded inside the 50 % shadenet house at 8:00 h was 61.0%, at 12:00 h was 31.5 % and at 16:00 h was 36.0 % respectively. Also the outside average relative humidity recorded at 8:00 h was 53.5 % at 12:00 h was 25.7 % and at 16:00 h was 29.5 %.

Light intensity :

Light plays an important role in the progress of photosynthesis of a plant. Appropriate light intensity accelerates the photosynthesis process at specific environmental conditions. Therefore, the study of light effect is an unavoidable part of the study. During the experiment, the light intensity was recorded at 8.00, 12.00, 4.00 hours. Fig.1 shows the average light intensity in the shadenet house. From the average table it is observed that light intensity was maximum in open field conditions as compared to the shadenet.

A) Variation of temperature, relative humidity and light intensity with respect to time in the month of November 2015 :

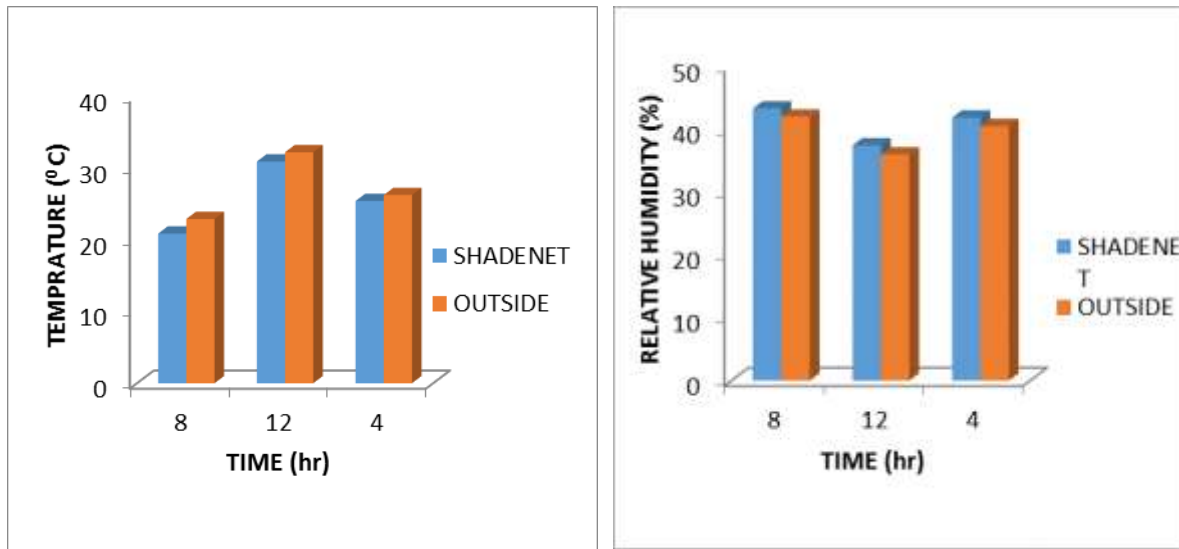


Fig. (a) and (b): Variation of temperature and relative humidity with respect to time

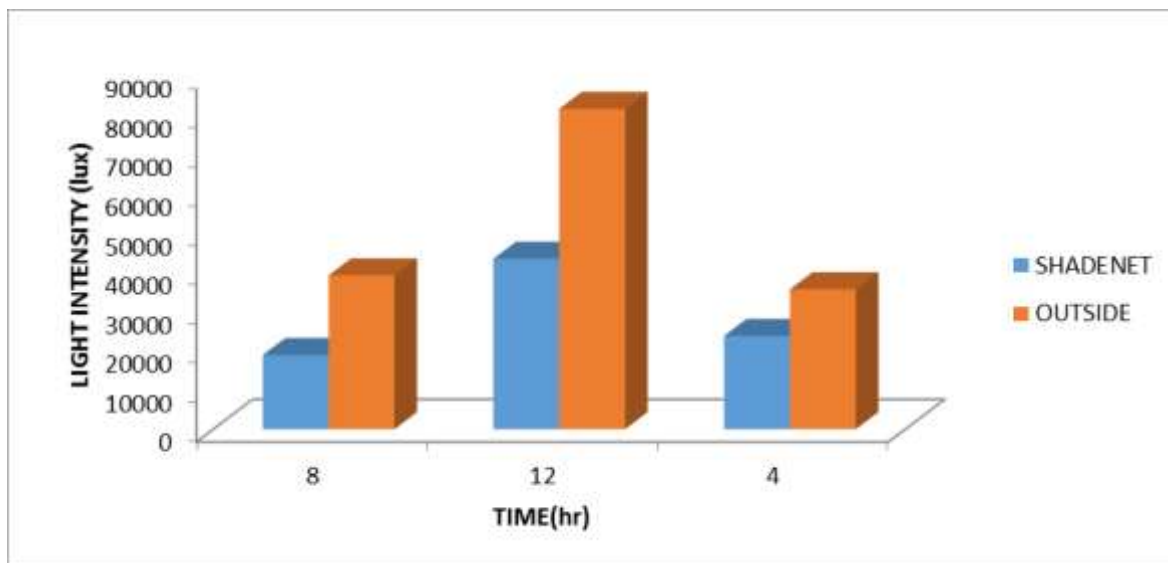


Fig. (c) :Variation of light intensity with respect to time

B) Variation of temperature, relative humidity and light intensity with respect to time in the month of December 2015 :

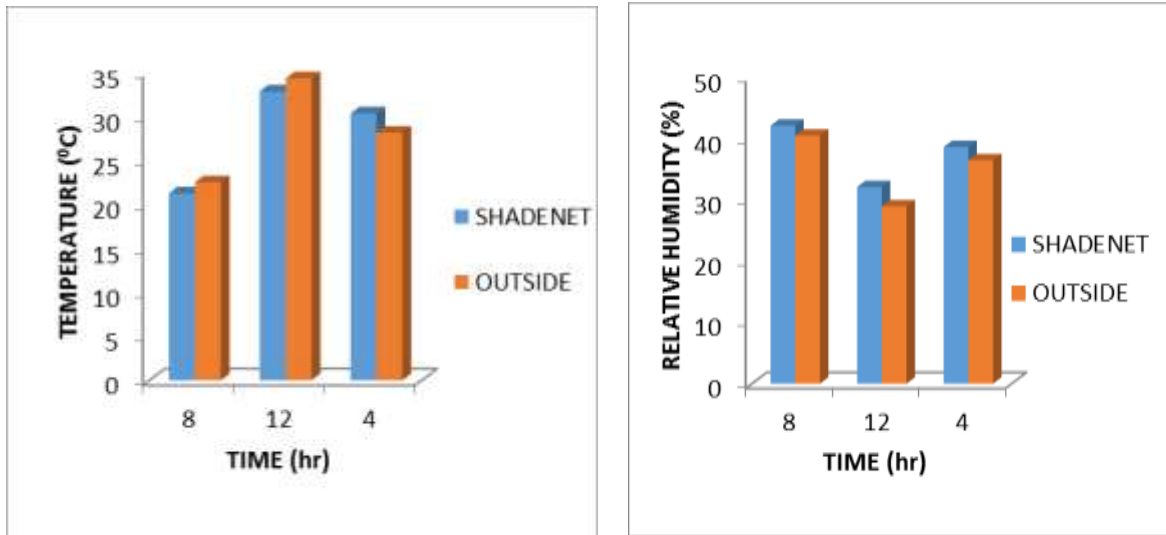


Fig. (a) and (b): Variation of temperature and relative humidity with respect to time

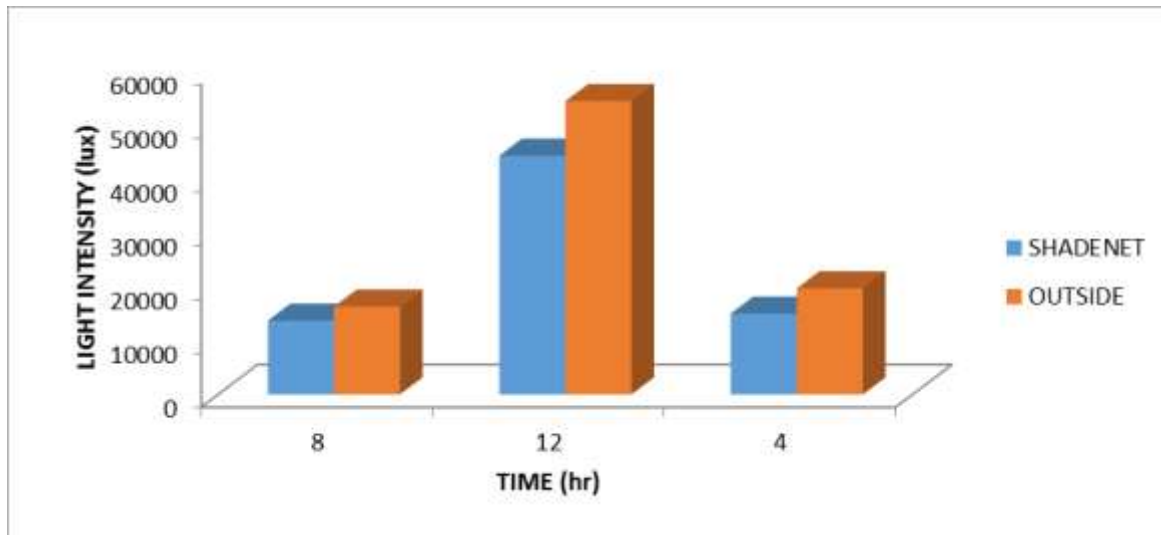


Fig. (c): Variation of light intensity with respect to time

C) Variation in temperature, relative humidity and light intensity with respect to time in month of January 2016 :

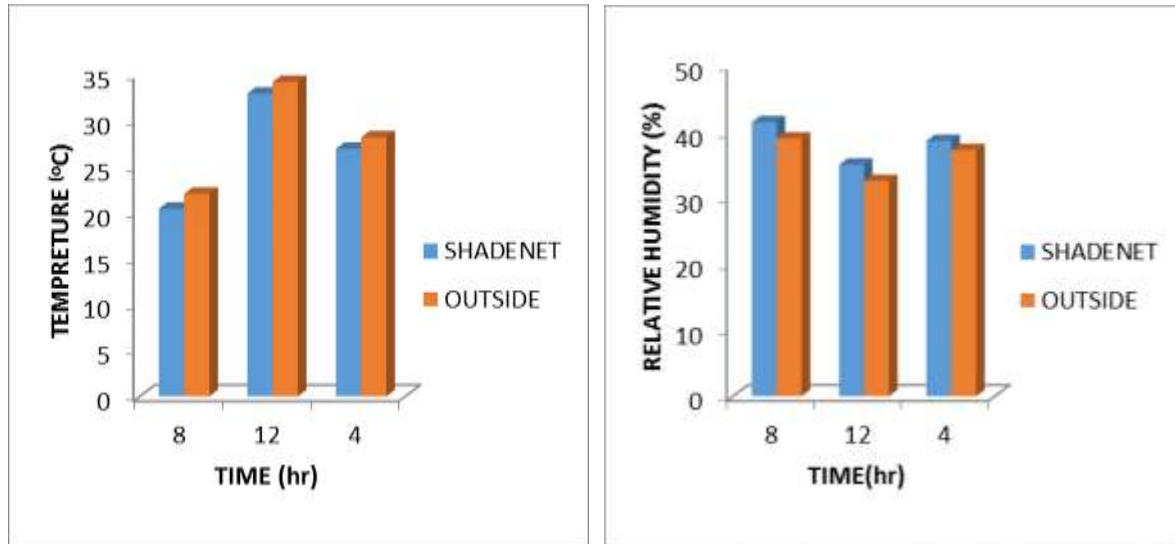


Fig. (a) and (b): Variation of temperature and relative humidity with respect to time

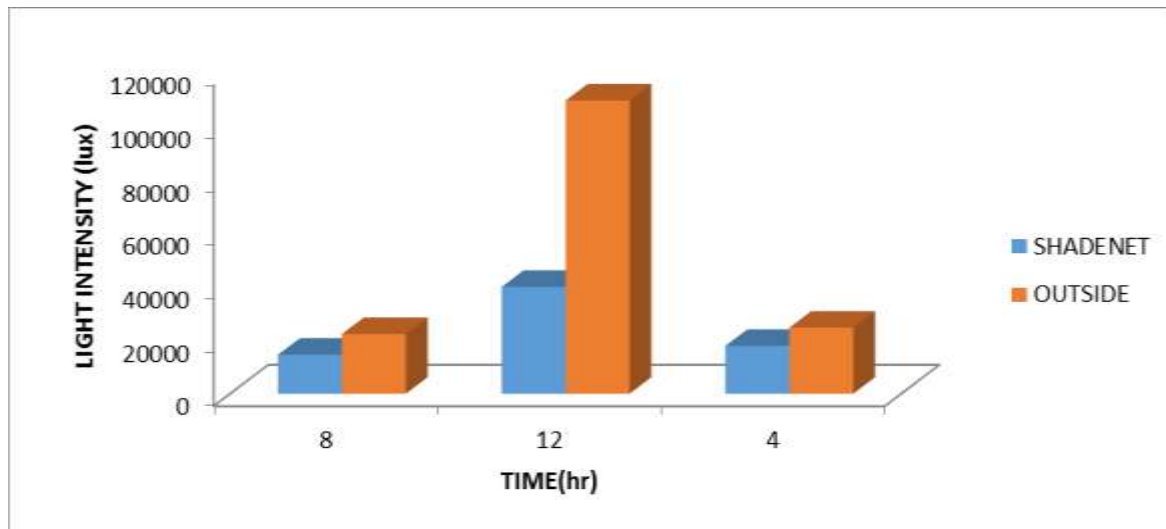


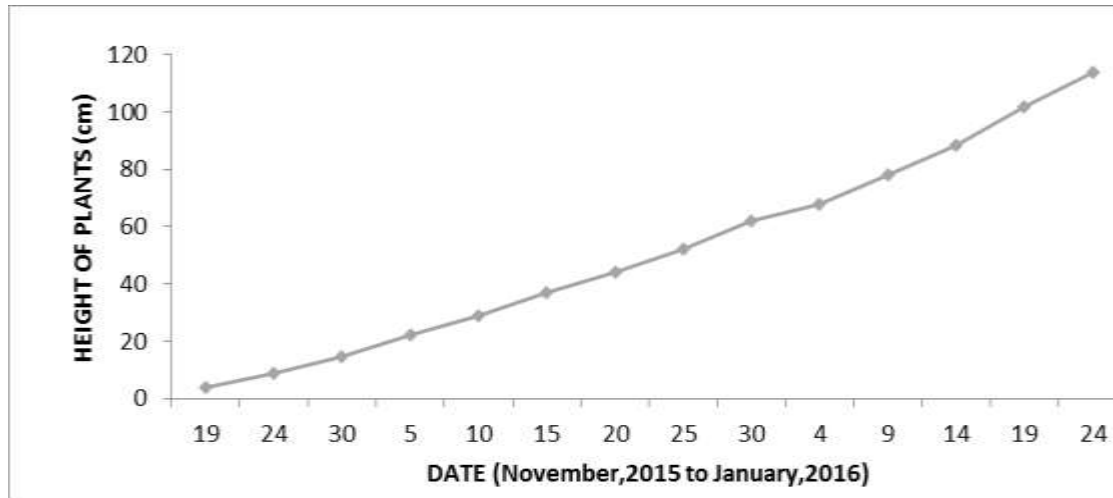
Fig. (c): Variation of light intensity with respect to time

Biometric characteristics:

Relation between height of plant, no. of leaves and no. of branches with respect to days :

Height of Plants: The rate of increase of height on an average was 1.2 cm per day in shadenet house respectively.

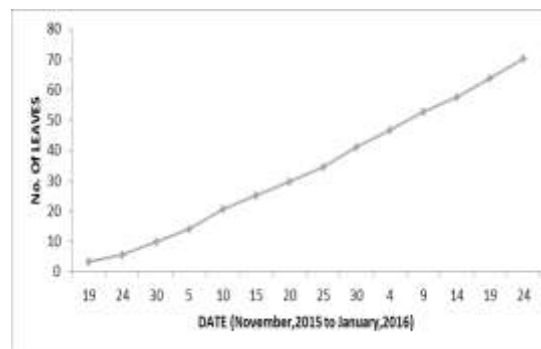
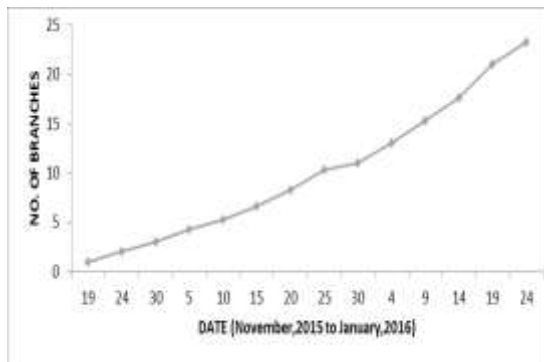
Fig. Relation between height of plant and days



No. of Leaves: The reason behind the higher vegetative growth in shadenet is higher rate of photosynthesis. The rate of photosynthesis depend upon light quality and CO₂ concentration. In the shadenet the wavelength UV light available is in the range which favour the photosynthesis.

Fig. : Relation between no. of leaves and days

No. of Branches: It is observed that the rate of increase of number of branches of plant average was 1 branch per day.



c) Relation between no. of branches and days

Yield of Fruit:

The total fruit yield from the shadenet house was recorded.



Yield of cucumber in shadenet.

SUMMARY AND CONCLUSION:

The performance of vegetable crop Cucumber drawn inside the shadenet house can be concluded as follows.

1. The average temperature inside the 50per cent shadenet house was about 3.20⁰C less than outside temperature.
2. The average relative humidity inside 50per cent shadenet house was about 7 to 10 per cent more than outside relative humidity.
3. The average light intensity inside 50per cent shade net house was about 42.96% of outside.
4. The average CO₂ concentration inside 50per cent green shadenet was about 3 times more than outside.
5. The micro climatic condition in the 50per cent shadenet house were more favorable for crop cucumber.
6. The total yield inside the shadenet house was 22 kg respectively.

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